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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/082,314	02/26/2002	Fumio Isshiki	ASAM.0053	2802

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EXAMINER
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GIESY, ADAM

ART UNIT	PAPER NUMBER
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2651

DATE MAILED: 04/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/082,314

Applicant(s)

ISSHIKI, FUMIO

Examiner

Adam R. Giesy

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 2/26/2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8, 11 and 14-18 is/are rejected.
- 7) ☒ Claim(s) 9, 10, 12 and 13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 2/26/2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 8-10 are objected to because of the following informalities:

Claim 8 should read "...AlGaP (aluminum, gallium, and phosphor)..." in order to maintain grammatical consistency throughout the claims.

Appropriate correction is required.

2. Claim 10 is objected to because of the following informalities:

Claim 10 should read "...half-value width ..." instead of "...half-width value..." in order to maintain consistent terminology throughout the claims.

Appropriate correction is required.

3. Claim 12 is objected to because of the following informalities:

Claim 12 should read "...half-width value..." instead of "...half-value width..." in order to maintain consistent terminology throughout the claims.

Appropriate correction is required.

4. Claim 13 is objected to because of the following informalities:

Claim 13 should read "...not greater than 90 nm at a room temperature..." instead of "...not greater than 90 nm as a room temperature..."

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Iwamoto et al. (Iwamoto - JP Doc No. H11-087831).

Iwamoto discloses an optical head (Figure 7) characterized by a light source formed of an indirect semiconductor laser (element 101 – this laser is deemed to be an indirect laser as per the definition of a direct laser as obtained from the specification of the applicant. The laser is from the AlGaP group, and thusly will be considered an indirect laser), a lens (element 102) for focusing a light beam (element L) from the light source onto a medium (element D), and a detector (element 107) for detecting a reflected light beam from the medium.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2-4, 6-8 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwamoto et al. (Iwamoto - JP Doc No. H11-087831) in view of Applied Physics Letters Vol. 67, Pages 1048-1050 (Issiki).

Regarding claim 2, Iwamoto discloses all of the limitations of claim 1 as discussed in the claim 1 rejection above. Iwamoto does not disclose that the semiconductor laser has an active layer for emitting a light beam, and an indirect semiconductor is used for the active layer.

Issiki discloses the active layer and that the active layer comprises an indirect semiconductor (See Figure 2 at the top of page 1049).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the disclosures of Iwamoto and Issiki, the motivation being in order to create a more efficient indirect semiconductor laser.

Regarding claim 3, Iwamoto discloses all of the limitations of claim 1 as discussed in the claim 1 rejection above. Iwamoto does not disclose that the semiconductor laser has a quantum well structure for emitting a light beam, the quantum well structure comprising an active layer, and a barrier layer, with an indirect semiconductor material interposed between the active layer and the barrier layer.

Issiki discloses a quantum well structure as depicted in Figure 1 (page 1048) in which the quantum well structure comprises an active layer, and a barrier layer, with an indirect semiconductor material interposed between the active layer and the barrier layer.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the disclosures of Iwamoto and Issiki, the motivation being in order to enhance the light emitting capabilities of the indirect semiconductor laser.

Regarding claim 4, Iwamoto discloses an optical head (Figure 7) with an indirect semiconductor laser (element 101 – this laser is deemed to be an indirect laser as per the definition of a direct laser as obtained from the specification of the applicant. The laser is from the AlGaP group, and thusly will be considered an indirect laser) and a detector (element 107) for detecting a reflected light beam from the medium. Iwamoto does not disclose that the semiconductor laser has an active layer made up of indirect semiconductor mixed crystal material.

Issiki discloses a semiconductor laser with an active layer made up of indirect semiconductor mixed crystal material (see layers in Figure 2, page 1049 since these layers are identical to the layers as shown in Figure 8 of the current application, Examiner is considering the layers to be composed of a mixed crystal material).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the disclosures of Iwamoto and Issiki, the motivation being in order to create a more efficient indirect semiconductor laser device.

Regarding claim 6, Iwamoto discloses all of the limitations of claim 1 as discussed in the claim 1 rejection above. Iwamoto does not disclose that the indirect semiconductor has an active layer, and has a quantum well structure.

Issiki discloses an indirect semiconductor laser with an active layer (see Figure 2 at the top of page 1049). Issiki also discloses a quantum well structure as depicted in Figure 1 (page 1048).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the disclosures of Iwamoto and Issiki, the motivation being in order to create a more efficient indirect semiconductor laser device.

Regarding claim 7, Iwamoto discloses all of the limitations of claim 1 as discussed in the claim 1 rejection above. Iwamoto does not disclose that the indirect semiconductor has an active layer, and has an adjacent confinement structure.

Issiki discloses an indirect semiconductor with an active layer (see Figure 2 at the top of page 1049), and with an adjacent confinement structure (labeled as neighboring confinement structure in Figure 1, page 1048 – see also the column above Figure 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the disclosures of Iwamoto and Issiki, the motivation being in order to create a more efficient indirect semiconductor laser device.

Regarding claim 8, Iwamoto and Issiki disclose all of the limitations of claim 4 as discussed in the claim 4 rejection above. Further, Issiki discloses that the material of the indirect semiconductor is of the AlGaP group (see Figure 2 on page 1049 – layers are shown on right side of graph).

Regarding claim 18, Iwamoto and Issiki disclose all of the limitations of claim 4 as discussed in the claim 4 rejection above. Further, Iwamoto discloses an optical disc device (see drawing 7). Since the optical head as disclosed by the combination of Iwamoto and Issiki in the claim 4 rejection above is made for recording optical media, it would be inherent to the disclosure of Iwamoto that the optical head of claim 4 would be used in an optical disc apparatus.

9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugaya et al. (Sugaya - US Pat. No. 5,400,308) in view of Iwamoto et al. (Iwamoto - JP Doc No. H11-087831).

Sugaya discloses an optical recording/reproducing device (Figure 3) with a recording laser (element 31) and a reproducing laser (element 37) provided independent from the recording laser. Sugaya does not disclose that the reproducing laser is an indirect semiconductor laser.

Iwamoto discloses an indirect semiconductor laser (element 101 – this laser is deemed to be an indirect laser as per the definition of a direct laser as obtained from the specification of the applicant. The laser is from the AlGaP group, and thusly will be considered an indirect laser).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the disclosures of Sugaya and Iwamoto, the motivation being in order to create a dual laser optical head with a more efficient data reproducing laser.

10. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iwamoto et al. (Iwamoto - JP Doc No. H11-087831) in view of Applied Physics Letters Vol. 67, Pages 1048-1050 (Issiki) and further in view of Applied Physics Letters Vol. 67, Pages 524-526 (Usami).

Regarding claim 11, Iwamoto and Issiki disclose all of the limitations of claim 4 as discussed in the claim 4 rejection above. Iwamoto and Issiki do not disclose that the indirect semiconductor material is an SiGe (silicon germanium) group.

Usami, however, discloses the benefits of using an SiGe material over the AlP/GaP material in the indirect semiconductor laser (see column two of the text on page 524 – see also Figure 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the disclosures of Iwamoto, Issiki, and Usami, the motivation being to create more efficient neighboring confinement structures which will enhance the carrier confining properties of the indirect semiconductor laser.

11. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iwamoto et al. (Iwamoto - JP Doc No. H11-087831) in view of Applied Physics Letters Vol. 67, Pages 1048-1050 (Issiki) and further in view of Yamaguchi et al. (US Pat. No. 5,365,535).

Iwamoto and Issiki disclose all of the limitations of claim 4 as discussed in the claim 4 rejection above. Iwamoto and Issiki do not disclose that a d.c. drive is used for driving the semiconductor laser.



Yamaguchi discloses a semiconductor laser that is driven in a DC manner (column 12, lines 14 and 15).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the optical head as shown in the combination of Iwamoto and Issiki with the DC powered semiconductor laser of Yamaguchi, the motivation being to achieve a broader spectrum output and increased stability.

12. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iwamoto et al. (Iwamoto - JP Doc No. H11-087831) in view of Applied Physics Letters Vol. 67, Pages 1048-1050 (Issiki) and further in view of Hayashi et al. (US Pat. No. 6,394,665 B1).

Iwamoto and Issiki disclose all of the limitations of claim 4 as discussed in the claim 4 rejection above. Iwamoto discloses that the indirect semiconductor laser is used as a light source (see drawing 5, element 101). Iwamoto and Issiki do not disclose that the optical head is characterized by an indirect semiconductor laser incorporating a multi-layer film at an end face of a resonator and serving as a light source.

Hayashi discloses that a reflective film is formed at one end face of a resonator (see abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the optical head as shown in the combination of Iwamoto and Issiki with the thin film as disclosed by Hayashi, the motivation being to increase the gain while allowing for excellent gain control.

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13. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iwamoto et al. (Iwamoto - JP Doc No. H11-087831) in view of Applied Physics Letters Vol. 67, Pages 1048-1050 (Issiki) and further in view of Momoo et al. (US Pat. No. 6,741,538 B2).

Iwamoto and Issiki disclose all of the limitations of claim 4 as discussed in the claim 4 rejection above. Iwamoto discloses that the indirect semiconductor laser is used as a light source (see drawing 5, element 101). Iwamoto and Issiki do not disclose that the optical head is characterized by a waveband pass filter for limiting the wavelength of the laser.

Momoo discloses a semiconductor laser system that uses a band-pass filter, in order to limit the reflection and transmission of the light by the wavelength (see column 1, lines 46-48).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the optical head and semiconductor laser as disclosed by the combination of Iwamoto and Issiki with the band-pass filter as disclosed by Momoo, the motivation being in order to limit the reflection and transmission of the light by the wavelength.

14. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iwamoto et al. (Iwamoto - JP Doc No. H11-087831) in view of Applied Physics Letters Vol. 67, Pages 1048-1050 (Issiki) and further in view of Misako (JP Pat. No. H05-182229 A).

Iwamoto and Issiki disclose all of the limitations of claim 4 as discussed in the claim 4 rejection above. Iwamoto discloses that the indirect semiconductor laser is used as a light source (see drawing 5, element 101). Iwamoto and Issiki do not disclose a cooler for lowering the temperature of a light emitting part of the semiconductor laser.

Misako discloses a cooling device for a semiconductor laser (see abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the optical head and semiconductor laser as disclosed by the combination of Iwamoto and Issiki with the cooler device as disclosed by Misako, the motivation being to cool the laser in order to maintain emission of constant wavelength.

*Allowable Subject Matter*

15. Claims 9, 10, 12, and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 9 is allowable over prior art of record as it does not disclose or suggest all of the limitations of claim 8 as well as the further limitation that **the half-width value of the exciting current for causing laser oscillation is not less than 20 meV but not greater than 400 meV in the form of optical energy range.**

Claim 10 is allowable over prior art of record as it does not disclose or suggest all of the limitations of claim 8 as well as the further limitation that **the half-width value of the exciting current for causing laser oscillation is not less than 6 nm but not greater than 100nm.**

Claim 12 is allowable over prior art of record as it does not disclose or suggest all of the limitations of claim 11 as well as the further limitation that **the half-width value of the exciting current for causing laser oscillation emits an output light beam having a continuous spectrum which is not less than 20 meV but not greater than 150 meV in the form of optical energy range.**

Claim 13 is allowable over prior art of record as it does not disclose or suggest all of the limitations of claim 11 as well as the further limitation that **the half-width value of the exciting**

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**current for causing laser oscillation emits an output light beam having a continuous spectrum which is not less than 13 nm but not greater than 90 nm at a room temperature (300 K).**

*Conclusion*

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

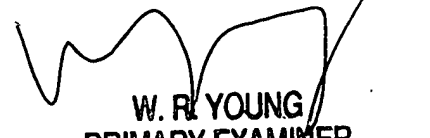
- a. Sugawara et al. (US Pat. No. 5,153,889) discloses a crystalline GaAlP structured used or semiconductor lasers.
- b. Chapple-Soko et al. (US Pat. No. 5,354,707) discloses a semiconductor laser with a quantum well structure that uses SiGe based material.
- c. Sato (US Pat. No. 6,072,196) discloses a semiconductor laser that uses GaAlP material (indirect semiconductor laser).

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adam R. Giesy whose telephone number is (571) 272-7555. The examiner can normally be reached on 8:00am- 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R. Hudspeth can be reached on (571) 272-7843. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ARG 3/22/2005

  
W. R. YOUNG  
PRIMARY EXAMINER